

The Dermanyssid Mites of Panama

(Acarina: Dermanyssidae)

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The dermanyssid mites of Panama have previously been known only from a single record of *Ornithonyssus bursa* (Berlese), published by Ewing (1922). Intensive sampling of these blood-sucking parasitic mites was accomplished by the senior author from 1960 to 1962 in conjunction with a survey of acarine-borne diseases. Collections were made from over 3000 Panamanian vertebrates, mostly mammals. Hosts were collected by shooting or trapping. A large percentage of the bats were caught in mist nets. Parasites were taken either by combing carcasses that had been kept overnight in individual plastic bags, or from pans of water where they had dropped from carcasses suspended overnight by strings above the pans. Many hosts, but not all, were sampled for intranasal mites by a nasal washing technique (Yunker, 1961). As a result, 41 species of Dermanyssidae were found. At least 11 of these are new species, of which only four are described here. The remaining seven, all from bats, will be described in a revision of world-wide species of bat-infesting dermanyssids (Radovsky, in ms.). A new genus is erected for one of the new species described here, and *Neoichoronyssus dentipes* is transferred to another new genus. Keys to the species from Panama and a host list are provided.

Of particular interest is the absence of dermanyssid mites from rice rats (*Oryzomys* spp.). Over 100 rice rats representing at least seven species were examined, but dermanyssid mites were never found. Neither do Strandtmann and Wharton (1958) list dermanyssids for *Oryzomys*. Host specificity may account for this lack of association. On the other hand,

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infestation with dermanyssids may be precluded by the presence of species of *Gigantolaelaps*, the predominant mesostigmatid mites on Panamanian *Oryzomys*.

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KEY TO THE PANAMANIAN GENERA OF DERMANYSSIDAE

FEMALES

1. Dorsal shield divided; metasternal setae absent; on birds.
 *Pellonyssus* Clark and Yunker
 Without this combination of characters. 2
2. Always on bats. 6
 On rodents, birds, or reptiles; never on bats. 3
3. At least some coxae bearing non-setigerous ventral spurs. 4
 Coxae without ventral spurs or coxae I or III with a setigerous spur or pedicel. 5
4. Spur of coxa I bifid and setigerous. *Acanthonyssus* n. gen.
 Spur of coxa I neither setigerous nor bifid. *Hirstionyssus* Fonseca
5. With a single dorsal shield; on rodents, marsupials or birds. *Ornithonyssus* Sambon
 With an anterodorsal prosomal shield and a posterodorsal pygidial shield or cluster
 of platelets; intranasal parasites of lizards. *Draconyssus* n. gen.
6. Dorsal shield divided. *Steatonyssus* Kolenati
 With a single dorsal shield. 7
7. Caudal setae peg-like and barbed; sternal plate with band-like posterior thickening; (protonymphs—the stage most often collected—differing from all others on bats in having claws of leg II much larger than those on other legs)
 *Ichoronyssus* Kolenati (group I)
 All setae smooth; sternal plate without posterior band. 8
8. Anterior margin of coxa II bearing one bifid spur or two simple spurs.
 *Radfordiella* Fonseca
 Anterior margin of coxa II with one simple spur. 9
9. Legs stout, leg I more so than leg II; with ridge-like ventral elevations on coxae I-IV; palpal trochanter without process. New genus no. 1

- Legs moderate in thickness; leg I no stouter, usually more slender, than leg II; with ventral elevations on coxae II-IV but not on coxa I; palpal trochanter with ventral spur or ridge.....10
10. Chelae edentate; palpal trochanter with ventral spur arising distally.....
.....*Ichoronyssus* Kolenati (group II)
- Fixed chela with two slender, curved, ventral teeth; palpal trochanter with ridge-like process arising along most of its length....*Ichoronyssus* Kolenati (group III)

Genus *Pellonyssus* Clark and Yunker

Pellonyssus Clark and Yunker, 1956, Proc. Helminth. Soc. Wash., 23: 93.

Type-species: *Pellonyssus passerii* Clark and Yunker, 1956.

KEY TO NEW WORLD SPECIES

FEMALES

1. Peritreme long, reaching to mid-level of coxa I; anteromarginal spur of coxa II absent*P. marui* n. sp.
Peritreme short, not reaching past mid-level of coxa II; anteromarginal spur of coxa II present2
2. First sternal setae short (<15 μ); sternal plate crescentic, nine or 10 times wider than long*P. passerii* Clark and Yunker
First sternal setae long (>40 μ); sternal plate rectangular, not more than six times wider than long*P. gorgasi* n. sp.

Pellonyssus marui, new species. Figure 1E-H.

DIAGNOSIS: Similar to *P. passerii* (fig. 1A-D); differing in size (smaller), in having a relatively longer sternal plate, in lacking an anteromarginal spur on coxa II and in the longer peritreme.

DESCRIPTION, HOLOTYPE FEMALE: Partially engorged; body approximately 330 μ wide at stigmata, 510 μ long exclusive of gnathosoma; dark brown in life.

Venter.—Tritosternum with two pilose laciniae. Sternal plate a short, wide band about 20 μ long by 165 μ wide. First pair of sternal setae about 19 μ long, second pair more than twice as long (45 μ) and third pair nearly three times as long (58 μ). Sternal plate with two pairs of slit-like pores. Third and fourth pairs of pores inserted on small circular platelets on integument; the former near coxae II, the latter near coxae III. Two similar pairs of pores on circular platelets seen ventrally on opisthosoma. Metasternal setae absent. Epigynial plate pointed posteriorly, reaching past fourth coxae; with a single pair of setae (26 μ). Anal plate ovoid, with flat anterior margin. Anal opening in anterior part of plate. Paired adanal setae (32 μ) arising on either side of anal opening just posterior to its midpoint. Single postanal seta shorter than adanals (20 μ) and arising anterior to cribrum. Peritremal plate posteriorly embracing coxa IV, anteriorly continuing on venter to humeral region, proceeding dorsally for a short distance at level with coxa I. Peritreme about 230 μ long, arising posteriorly in stigma at level of coxa IV and terminating anteriorly at mid-level of coxa I. Postcoxal apodeme III continuous with peritremal plate and extending into the lateral vaginal wall as spur-shaped apodeme. Opisthosoma with 13 pairs of setae that increase in size posteriorly (from 25 μ at level of epigynial plate to 70 μ at end of idiosoma).

Dorsum.—Dorsal shield divided, both segments large, covering most of idiosoma. Anterior (prosomal) shield about 220 μ wide at posterior end, 220 μ long, roughly triangular; posterior margin straight; surface reticulate, bearing nine pairs of setae: five lateral and four submedian, the former about 23 μ long, the latter about 17 μ long, and a single pair of anterior, lyriiform pores. A pair of minute vertical setae (5 μ) on integument just anterior to shield. Posterior shield slightly narrower than base of anterior shield, about 170 μ wide at anterior end, 260 μ long. Anterior margin straight, lateral margins tapering to a blunt point. Shield strongly reticulate, with six pairs

of setae: the three posterior pairs submarginal, increasing in size posteriorly (13 μ –17 μ –26 μ), the three anterior pairs submedian, about 15–17 μ long. Dorsal integument with 27–28 pairs of setae (including verticals), those posterior and lateral heavier and longer (e.g., 48 μ) than those anterior and median (e.g., 19 μ).

Gnathosoma.—Chelicerae with elongate, attenuate apical segment (210 μ long by 7–10 μ wide), and shorter wider basal segment (93 μ long by 14 μ wide); terminating in small, shear-like chelae. Chelae with two recurved teeth on movable digit, and a membranous fringe on fixed digit.

Legs.—All legs with caruncles and paired claws. Coxa II without obvious anteromarginal spur.

MALE: Body approximately 270 μ wide at stigmata, 430 μ long exclusive of gnathosoma. Holoventral plate irregular in outline, approximately parallel-sided between coxae, widening slightly posterior to coxae IV, markedly constricted at beginning of anal plate; surface reticulate, with six to eight pairs of setae in addition to three setae on anal plate. First sternal setae approximately 5 μ long, second and third approximately 23 μ long; metasternal setae absent; genital setae approximately 20 μ long; two to four pairs of ventral integumental setae of size similar to that of genital setae; paired adanal setae (30 μ) arising on either side of posterior of anal opening, shorter (21 μ) postanal seta arising anterior to cribrum. Ventral and ventrolateral aspects of unsclerotized venter with eight to ten pairs of setae, the lateral and terminal setae heavier and longer (e.g., 46 μ) than the ventral setae (e.g., 20 μ). Peritreme arising at stigma located at level of coxa IV, curving regularly to anterior level of coxa II; approximately 155 μ long. Tritosternum with two laciniae, pilose from base anteriorly. Coxa II without obvious anterodorsal spur. Dorsal shield entire, elongate and narrow (496 μ long by 225 μ wide), tapering to blunt point, surface reticulate, with 12 pairs of setae. Dorsum with 15–17 pairs of non-plate setae, of sizes similar to corresponding setae on venter. Chelicerae shorter and stouter than in female, basal segment expanded, remainder elongate and narrow, length of apical segment, including chelae, 130 μ . Spermatodactyl 19 μ long, bifurcate, with both members of nearly equal length, the thicker member trough-like. Fixed chela shorter and narrower than spermatodactyl. Deutosternum with eight teeth in single file.

PROTONYMPH (unfed): Body approximately 296 μ long by 185 μ wide. Sternal plate oval, 111 μ long by 93 μ wide; with three pairs of setae, each 25 μ long. Anal plate oval, 67 μ long by 56 μ wide, with a pair of adanal setae (37 μ) and a single postanal seta (19 μ). Anus near anterior margin of plate. Five pairs of non-plate setae on venter. Peritreme originating in stigma at level of coxa IV and extending anterior to level of middle of coxa III, approximately 37 μ long. Coxa II without obvious anteromarginal spur. Tritosternum with two indistinctly pilose laciniae. Dorsum with four shields: one large prosomal (177 μ long by 179 μ wide), one smaller pygidial (37 μ long by 92 μ wide) and two minute irregular platelets (18 μ diam.) just posterior to prosomal plate. Prosomal shield with nine pairs of setae, each 10 μ long; a pair of minute vertical setae on integument just anterior to shield. Pygidial shield with three pairs of setae, the anteriormost pair minute (7 μ long), the other two pairs heavier and longer (48 μ and 60 μ). Chelicera functional, similar in form to that of female. Apical segment, including chelae, approximately 150 μ long.

TYPE MATERIAL: Holotype female (U.S.N.M. no. 66608), 4 paratype females, 1 paratype protonymph and 2 paratype males from nest of *Cassidix mexicanus*, Ancón (Canal Zone), 10 May 1961, collected by C. E. Yunker and N. Smith; 17 paratype females, 11 paratype protonymphs and 2 paratype males from *Vireo flavoviridis*, and 7 paratype females from *Turdus grayi*, Carrasquilla (Panamá), 3 June 1961, collected by A. Muñoz; 2 paratype females from *Progne chalybea*, Corozal ice plant (Canal Zone), 11 April 1961, collected by C. M. Keenan; 4 paratype females, 2 paratype males and 1 paratype protonymph from nest and young of *Columbigallina*

talpacoti, Corozal (Canal Zone), 26 June 1961, collected by C. E. Yunker and A. Muñoz.

Paratype specimens to be distributed among the collections of the following institutions: United States National Museum; Chicago Natural History Museum; British Museum (Natural History), London; Rocky Mountain Laboratory, Hamilton, Montana; Institute of Acarology, Ohio State University, Columbus; Department of Entomology and Parasitology, University of California, Berkeley; Snow Entomological Museum, University of Kansas, Lawrence; South African Institute for Medical Research, Johannesburg.

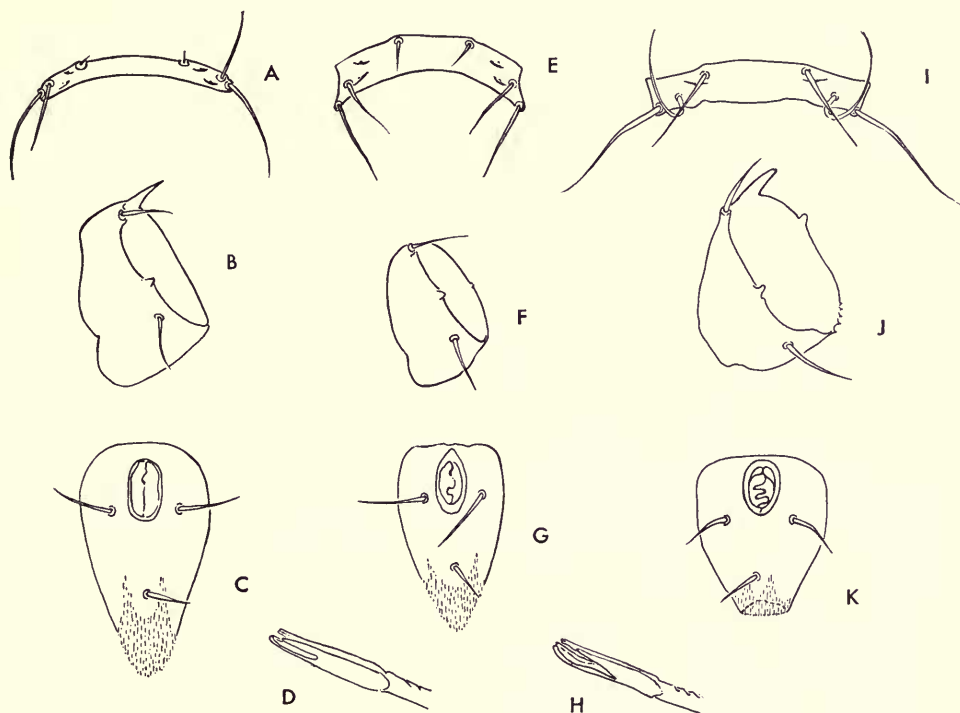


Fig. 1. *Pellonyssus passeri* Clark and Yunker. A, female sternal plate. B, female coxa II. C, female anal plate. D, male chelae. *Pellonyssus marui*, new species. E, female sternal plate. F, female coxa II. G, female anal plate. H, male chelae. *Pellonyssus gorgasi*, new species, female. I, sternal plate; J, coxa II; K, anal plate.

ADDITIONAL MATERIAL EXAMINED: *Pellonyssus marui* was also seen from neotropical areas other than Panama: 23 females and 1 male from *Pitangus sulfuratus*, Rio de Janeiro, Brazil, 29 December 1948, collected by H. W. Krumm; 3 females from "Gray kingbird," Little Inagua Island, British West Indies, "8-5-30," collected by H. S. Peters; 20 females, 42 protonymphs and 15 males from *Coereba portoricensis*, Mayaquez, Puerto Rico, 28 March 1948, collected by Virgilio Biaggi.

Pellonyssus gorgasi, new species. Figure 1 I-K.

DIAGNOSIS: Differing from *P. passerii* and *P. marui* in possessing elongate sternal setae I (nearly twice as long as plate); differing further from *P. marui* in having an anteromarginal spur on coxae II and a short peritreme.

DESCRIPTION, HOLOTYPE FEMALE: Damaged; body approximately 336 μ wide at stigmata, 580 μ long exclusive of gnathosoma.

Venter.—Tritosternum with two pilose laciniae. Sternal plate approximately rectangular, about 20 μ long by 113 μ wide. First pair of sternal setae 43 μ long, second pair 58 μ , and third pair 68 μ . Only the first pair of sternal pores evident on sternal plate of the holotype, lyriform; second sternal pores not seen. Third pair of pores circular, on soft integument near coxae II; a fourth pair similar to third pair on soft integument near coxae IV. Metasternal setae absent. Epigynial plate pointed posteriorly, reaching past fourth coxae; with a single pair of setae (35 μ). Anal plate broadly ovoid, with a truncate anterior margin. Anal opening in anterior of plate; paired adanal setae (26 μ) arising at level of posterior of anal opening. Single postanal seta (23 μ) arising anterior to cribrum. Peritremal plate posteriorly embracing coxa IV, anteriorly terminating at anterior level of coxa II. Peritreme about 154 μ long, posteriorly arising in stigma between coxae III and IV and anteriorly terminating at mid-level of coxa II. Postcoxal apodeme III continuous with peritremal plate and extending into lateral vaginal wall as spur-shaped apodeme. Opisthosoma with 22-24 pairs of setae that increase in size posteriorly (from 34 μ at level of epigynial plate to 50 μ at end of idiosoma).

Dorsum.—Dorsal shield divided, both segments large, covering most of idiosoma. Anterior (prosomal) shield 255 μ wide at posterior end, 280 μ long, roughly in the shape of a triangle; posterior margin straight; surface reticulate, bearing nine pairs of setae: five lateral and four submedian, the former 20-25 μ long, the latter 10-15 μ long, and one pair of anterior lyriform pores. A single pair of minute (<10 μ) vertical setae on integument just anterior to shield. Posterior shield slightly narrower than base of anterior shield, about 220 μ wide at anterior end, 270 μ long. Anterior margin concave. Posterior of shield terminating in blunt point; lateral margins not tapering evenly to this point, but indented near posterior end. Shield reticulate, only five pairs of setae visible (but pygidial area poorly cleared): the two posterior pairs marginal, the terminal pair longer (16 μ) than the subterminal (10 μ); the three anterior pairs submedian, about 12 μ long. Dorsal integument with 30-34 pairs of setae (including verticals), those posterior and lateral heavier and longer (e.g., 50 μ) than those anterior and sublateral (e.g., 18 μ).

Gnathosoma.—Chelicerae with elongate, attenuate apical segment (233 μ long by 10 μ wide), and shorter, wider basal segment (18 μ long by 20 μ wide). Chelae poorly cleared; shear-like and apparently edentate.

Legs.—All legs with caruncles and paired claws. Coxa II with an elongate anteromarginal spur.

TYPE MATERIAL: Holotype female (U.S.N.M. no. 66607) from *Phaethornis guy*, Cerro Punta (Chiriquí), about 5200 feet elevation, 27 April 1961, collected by C. E. Yunker. Known only from the type specimen.

Genus Ornithonyssus Sambon

Ornithonyssus Sambon, 1928, Ann. Trop. Med. Parasit., 22: 105.

Type-species: *Dermanyssus sylviarum* Canestrini and Fanzago, 1878.

KEY TO PANAMANIAN SPECIES**FEMALES**

1. Proximal seta of coxa I arising from a spur-like elevation. . . . *O. wernecki* (Fonseca)
- Proximal seta of coxa I not pedicellate. 2

2. Sternal plate with two pairs of setae. 3
 Sternal plate with three pairs of setae. 4
3. Medial and sublateral setae of dorsal shield short, not over 25 μ ; on birds.
 *O. sylviarum* (Canestrini and Fanzago)
 All dorsal shield setae long, over 35 μ ; on porcupines. . . *Ornithonyssus coendou* n. sp.
4. Setae of dorsal shield shorter than those on dorsal integument; on birds.
 *O. bursa* (Berlese)
 Setae of dorsal shield at least as long as those on dorsal integument; on rodents.
 *O. bacoti* (Hirst)

***Ornithonyssus sylviarum* (Canestrini and Fanzago)**

Dermanyssus sylviarum Canestrini and Fanzago, 1878, Atti R. Istit. Veneto Sci. Lett. Arti, (5), 4: 124.

The northern fowl mite is a common, serious, blood-sucking parasite of passeriform birds and domestic fowl in temperate regions throughout the world. Thirteen females were taken from a toucan, *Aulacorhynchus prasinus*, in Cerro Punta (Chiriquí), at approximately 5200 feet altitude. This is apparently the southernmost New World record for *O. sylviarum*, previously not recorded south of the United States. It is noteworthy, however, that it has not yet been found in the tropical lowlands. This parasite should be searched for in other areas of Panama.

***Ornithonyssus bacoti* (Hirst)**

Leiognathus bacoti Hirst, 1913, Bull. Ent. Res., 4: 122.

The tropical rat mite is a common blood-sucking parasite of many species of rodents throughout the world, and is capable of attacking birds and many mammals including man. In Panama, it was the most common dermanyssid encountered and was taken during all months of the year. Preferred hosts were *Proechimys semispinosus* and *Sigmodon hispidus*. In the higher elevations of Chiriquí Province, it was collected only from *Peromyscus nudipes*.

Although taken on nine occasions from *Liomys adspersus*, a spiny pocket mouse, it was never seen on *Heteromys desmarestianus*, a closely related rodent, despite extensive collection of the latter. Other infrequent hosts were *Zygodontomys microtinus* and *Rattus rattus*. Localities involved were: both Atlantic and Pacific sides of Canal Zone; Achiote (Colón); Las Palmitas and Guánico (Los Santos); Cerro Punta, Bambito and El Hato (Chiriquí).

***Ornithonyssus bursa* (Berlese)**

Leiognathus bursa Berlese, 1888, Boll. Soc. Ent. Italiana, 20: 208.

The tropical fowl mite, common on many species of birds in warmer climates of the world, was recorded by Ewing (1922) "on common hen" in the Canal Zone. Subsequent records are lacking, and the species was not encountered in this study. Here, however, birds were not frequently examined. We have seen specimens from domestic fowl in Costa Rica and the species is recorded from Colombia; there is no reason to doubt its presence in Panama.

Ornithonyssus coendou, new species. Figure 2.

DIAGNOSIS: Similar to *O. sylviarum*, differing: in size (larger), in possession of long, subequal setae on dorsal shield, and in having adanal setae that arise at posterior level of anal slit. Known only from the porcupine, *Coendou rothschildi*.

DESCRIPTION, HOLOTYPE FEMALE: Body approximately 425 μ wide at stigmata, 670 μ long exclusive of gnathosoma.

Venter.—Tritosternum with two pilose laciniae. Sternal plate rectangular, about 36 μ long at mid-line by 92 μ wide at sternal setae II; with two pairs of setae and two pairs of lyriform pores; surface adjacent to setae ornamented with cell-like reticulations; parts of these reticulate areas covered with punctations. Third sternal setae on integument between sternal plate and epigynial opening. Metasternal setae present, adjacent to coxae III. Third sternal pores located between sternal setae III and metasternal setae. Epigynial plate narrow, pointed posteriorly, broad and fan-shaped anteriorly, with a pair of setae. A pair of circular pores on integument near genital setae. Anal plate ovoid, with the usual three setae and posterior denticulate cribrum. Adanal setae arising at a level with posterior of anus, slightly shorter than postanal seta. Stigma large (21 μ diam.) circular, located lateral and posterior to coxa III. Peritreme wide, extending anteriorly, bending dorsally, and terminating over mid-region of coxa I. Peritremal plate fusing with endopodal apodeme to nearly encircle coxa IV. Ventral integument with about 30 pairs of non-plate setae, those anterior smallest (*e.g.*, 33 μ), those lateral and posterior longest (*e.g.*, 47 μ). All posteroventral setae distinctly terminally branched (fig. 2B). A pair of narrow elongate platelets flanking posterior end of epigynial shield. Metapodal platelets irregular, small, in lateral post-coxal area.

Dorsum.—With a single, long shield having sinuous lateral margins and tapering posteriorly to a narrow, rounded point. Shield with 17 pairs of setae, anteriormost pair relatively minute, others elongate (about 40 μ), terminally branched. Dorsal integument with about 50 pairs of non-plate setae, all well developed, terminally branched and elongate. Those lateral and posterior longest (*e.g.*, 45 μ).

Legs.—I and IV subequal in length, longer than II and III, which are also subequal. Each leg with a pretarsus bearing ambulacral claws and a small membranous caruncle. All segments without obvious spurs or protuberances, except coxa II, which bears an anteromarginal spur. All but distal leg setae terminally branched, those dorsal somewhat longer and thicker than those ventral, especially on legs I and II.

Gnathosoma.—Internal hypostomal setae much longer than external and anterior hypostomal setae and gnathosomal base setae. With nine or 10 deutosternal teeth arranged in a single file. Hypostomal processes elongate. Palpal trochanter with a small ventral protuberance. Chelicerae chelate; chelae edentate, resembling those of other species of *Ornithonyssus*.

MALE: Body approximately 278 μ wide at stigmata, 450 μ long, exclusive of gnathosoma. Holoventral plate irregular in outline, with 21 setae (occasionally one member of a pair off plate). With 10 pairs of ventral non-plate setae. Stigma as in female; peritreme extending anteriorly, bending dorsally and terminating over anterior region of coxa II. Dorsal shield broad, covering most of dorsum, tapering posteriorly to a point; with 19-21 pairs of setae similar to those of female. Dorsum with nine or 10 pairs of non-plate setae. Coxa II with usual anteromarginal spur. Palpal femur with a large ventral protuberance bearing a spiniform seta (fig. 2F). Chelicera as in female except for chela, which bears a scapiform spermatodactyl (fig. 2G).

PROTONYMPH: Body approximately 520 μ long by 325 μ wide. Sternal plate shield-shaped, with three pairs of setae. Anal plate oval, with three setae. Six pairs of non-plate setae on venter. Peritremalia a short, lateral crescent. Coxa II with a small, blunt anteromarginal spur. Dorsum with prosomal plate having 10 pairs of setae, a pygidial plate having three pairs of setae, and two small, bare platelets just posterior to prosomal plate. Eleven pairs of non-plate dorsal setae.

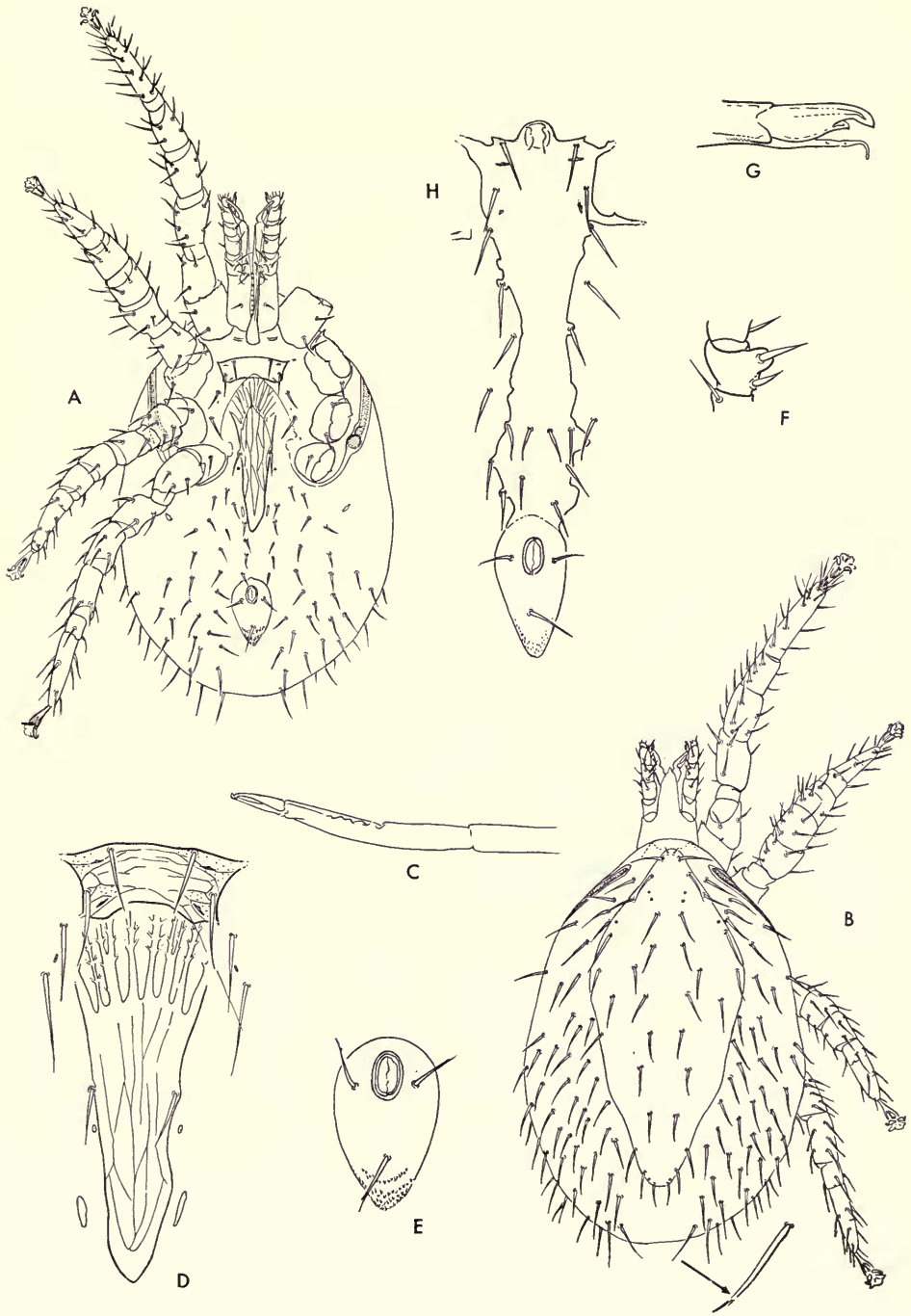


Fig. 2. *Ornithonyssus coendou*, new species. A, female venter. B, female dorsum. C, female chelicera. D, female sternal and epigynial area. E, female anal plate. F, male palpal trochanter. G, male chelae. H, male holoventral plate.

TYPE MATERIAL: Holotype female (U.S.N.M. no. 66610), 1 paratype female and 2 paratype nymphs from *Coendou rothschildi*, near Pedro Miguel River, Paraíso (Canal Zone), 21 February 1962, by J. M. Brennan and C. E. Yunker, deposited in United States National Museum. Allotype male, and 10 paratype nymphs, same data, but 12 March 1962, in United States National Museum. One paratype female and 7 paratype nymphs, same data, but 26 February to 20 March 1962, in collection of Rocky Mountain Laboratory, Hamilton, Montana.

Ornithonyssus wernecki (Fonseca)

Liponyssus wernecki Fonseca, 1935a, Mem. Inst. Butantan, 9: 70, figs. 1-8.

This species is a common parasite of marsupials in Panama. Hosts from which we collected it are *Didelphis marsupialis*, *Marmosa robinsoni*, *Philander opossum* and *Metachirus nudicaudatus*. Localities include France Field, Fort Sherman and Fort Gulick (Atlantic side of Canal Zone); Cerro Campana and Cerro Azul (Panamá). Collected mainly during the drier months, March and April, we also have a collection taken in November, France Field (Canal Zone), from *Didelphis marsupialis*.

Acanthonyssus, new genus

Type-species: *Ichoronyssus dentipes* Strandtmann and Eads, 1947.

DIAGNOSIS: Macronyssinae; all setae smooth; dorsal shield entire and broadly rounded posteriorly; all coxae bearing one or more stout ventral spurs; coxa II with one simple anterodorsal spur; outer ventral spur of coxa I bifid and bearing proximal seta at furcation; some middle segments of legs II-IV bearing strong recurved spurs.

FEMALE: sternal plate short, without surface markings other than usual sculpturing and pores; sternal setae II much closer to III than to I; epigynial plate cuneate, with well-defined scale-like, anterior sculpturing; peritremes moderately broad, terminating over coxa I; chelae simple, without setae, teeth or other processes; palpal trochanter with distal ventral spur.

MALE: ventral armature entire; palpal trochanter without process.

REMARKS: Furman and Radovsky (1963) synonymized *Neoichoronyssus* by transferring the type-species, *N. wernecki*, to *Ornithonyssus*. In doing so, they left the generic status of *N. dentipes* unresolved. This new genus is proposed for *N. dentipes*.

Acanthonyssus dentipes (Strandtmann and Eads), *new combination*.

Ichoronyssus dentipes Strandtmann and Eads, 1947, Jour. Parasit., 33: 31, figs. 1-3.

Described from *Sigmodon hispidus* in Texas, this species was recovered mainly from *Proechimys semispinosus* in the Canal Zone (Miraflores, Summit, Gamboa, Coco Solo, France Field and Fort Gulick). It was taken only during the drier months, December to May, 1960-1962. Two collections, however, from Almirante (Bocas del Toro), August 1960, by P. Galindo were from the type host, *Sigmodon hispidus*.

Some of the material from *Proechimys* showed various but not obviously consistent morphological differences from specimens from the type host.

These variations were particularly noticeable in the dimensions of the sternal plate (range = 23 μ long by 118 μ wide to 32 μ long by 112 μ wide), the degree of biconcavity of the lateral margins of the dorsal shield, and the number and relative size of the ventral setae. It is possible that two species are involved here.

Genus *Hirstionyssus* Fonseca, 1948

Hirstionyssus Fonseca, 1948, Proc. Zool. Soc. London, 118: 266.

Type-species: *Dermanyssus arcuatus* Koch, 1839.

Seven species of *Hirstionyssus* are known from Panama. They are described and keyed by Strandtmann and Yunker elsewhere in this volume. Of these, all but one are from heteromyid and cricetid rodents. The exception is from squirrels. A list of the species and their hosts is included in the host list of this paper.

Draconyssus, new genus

Type-species: *Draconyssus belgicae*, new species.

DIAGNOSIS: Dermanyssidae; with two dorsal shields or with a single prosomal shield and a cluster of pygidial platelets; second cheliceral segment extremely elongate, but not attenuate, at rest deeply withdrawn into idiosoma; sternal plate with two pairs of setae; metasternal setae absent; epigynial setae off plate; peritreme extending to level of middle of coxa II. Male unknown.

REMARKS: At this point we are unable to assign *Draconyssus* to a subfamily within the Dermanyssidae. We suspect it to be macronyssid and to have affinities with *Ophionyssus* and *Sauronyssus*. Cheliceral conformation—the sole basis for subfamilial placement—is not applicable here. The chelicerae of *Draconyssus belgicae*, n. sp., although extremely elongate and withdrawn into the idiosoma as in the Dermanyssinae, are also strongly chelate and definitely not attenuate, as in the Macronyssinae. A similar, but not as pronounced, elongation of the chelicerae is seen in *Pellonyssus* and *Ophionyssus* (Macronyssinae). *Hystrichonyssus* (Hystrichonyssinae) shows elongate attenuate chelicerae, but here the proximal segment is elongate whereas the second segment is normal. It has been obvious to us for some time that cheliceral modifications are unsatisfactory indicators of phylogeny in this group. Until a better basis for classification is reached, *Draconyssus* must remain as an unassigned genus of Dermanyssidae.

Draconyssus belgicae, new species. Figure 3.

DESCRIPTION, HOLOTYPE FEMALE: Body approximately 405 μ wide at stigmata, 668 μ long exclusive of gnathosoma.

Venter.—Tritosternum with two pilose laciniae and serrate lateral membranes. Sternal plate roughly rectangular with irregular borders, about 54 μ long at mid-line by 93 μ wide at sternal setae II; with two pairs of setae and two pairs of lyriform pores; surface densely covered by coarse punctations that become less dense posterior to sternal setae II. Third sternal setae on integument between sternal plate and epigynial opening. Metasternal setae absent. Epigynial setae on unsclerotized integument between lateral margins of epigynial plate and coxae IV. Sternal and epigynial setae

subequal in length. Third sternal pores circular, on integument just posterior to sternal setae III, and overlapped by hyaline anterior margin of epigynial plate. A fourth pair on unsclerotized integument just posterior of epigynial setae and three similar pairs on hysterosoma. Epigynial plate narrow, pointed posteriorly, broad and fan-shaped anteriorly, and biconcave laterally in region of coxae IV. Anal plate ovoid, with the usual three setae and posterior denticulate cribrum; adanal setae arising at a level with posterior of anus, subequal in length to postanal seta. Peritreme arising at stigmata located lateral to and between coxae III and IV, extending anteriorly and becoming dorsal at termination over mid-region of coxa II; peritremal plate fusing with endopodal apodeme to nearly encircle coxa IV. Ventral integument with 15 or 16 pairs of non-plate setae; those lateral and posterior longest (about 53μ); those medial and anterior of anal plate shorter, subequal to sternal and epigynial setae (about 37μ). All ventral setae terminally branched. A pair of narrow elongate platelets flanking posterior end of epigynial shield. Metapodal platelets irregular crescents, located in lateral post-coxal area.

Dorsum.—With two sclerotized shields. Propodosomal shield biconvex; twice longer than wide; with six pairs of setae. Pygidial shield minute, irregular in outline, without setae. Dorsal integument with 25 or 26 pairs of non-plate setae, including verticals. All dorsal setae well developed, terminally branched, and subequal (about 50μ long). Two pairs of circular pores dorsal on hysterosoma.

Legs.—I and IV subequal in length, longer than II and III, which are also subequal. Each leg with a pretarsus bearing ambulacral claws and membranous caruncles. All segments without obvious spurs or protuberances. Leg setae as in body setae, terminally branched; those dorsal somewhat longer and thicker than those ventral, especially on legs I and II.

Gnathosoma.—Internal hypostomal setae much longer than external and anterior setae and gnathosomal base setae. With eight or nine deutosternal teeth arranged in a single file. Hypostomal processes elongate, ensheathed by lateral folds of tectum. Tectum forming an elongate tube, extending to level with base of palpal tarsi. Chelicerae elongate and whip-like. Basal segment short (21μ); distal segment sinuous and elongate (363μ). Chelae chelate and edentate, the movable digit somewhat shorter and stouter than the fixed digit; the latter with a slight, recurved tip (fig. 3C).

TYPE MATERIAL: Holotype female (U.S.N.M. no. 66609) intranasal in *Ameiva bifrontata*, a teiid lizard, Nuevo Emperador (Canal Zone), 10 August 1961, collected by C. E. Yunker and A. Muñoz. Three paratype females bearing the same data as the holotype; 3 paratype females intranasal in *Ameiva* sp., K-9 Road (Pacific side of Canal Zone), 18 October 1961, collected by C. E. Yunker and A. Muñoz. The holotype and a paratype will be deposited in the United States National Museum; remaining paratypes will be distributed among the collections of Chicago Natural History Museum; Rocky Mountain Laboratory, Hamilton, Montana; Institute of Acarology, Ohio State University, Columbus; Snow Entomological Museum, University of Kansas, Lawrence.

REMARKS: Variation was seen in the shapes of the dorsal shields and ventral plates, which were often eroded and irregular. The pygidial shield of certain specimens was represented only by a cluster of two or three irregular platelets. The epigynial plate varied in outline from an irregular, asymmetrical linguiform one, to one with perfectly parallel sides ending posteriorly in a glans-shaped expansion. The outline of the dorsal shield was occasionally irregular, and in one specimen it included the bases of two lateral setae typically found on the bare integument. The sternal shield was often seen to be eroded on its posterior margin.

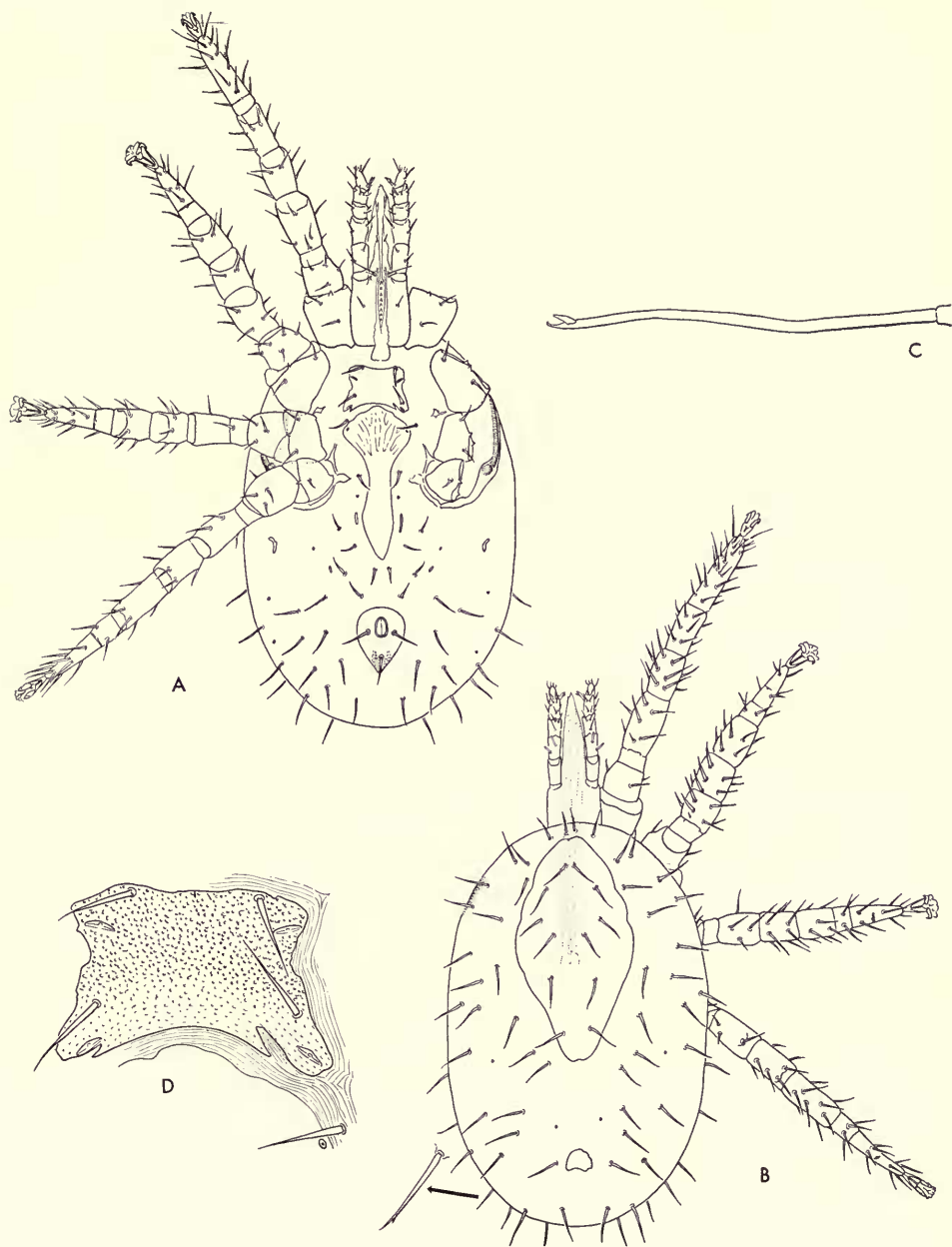


Fig. 3. *Draconyssus belgicae*, new genus, new species, female. A, venter. B, dorsum. C, chelicera. D, sternal plate.

The species is named for Miss Bélgica E. Rodríguez R., Middle America Research Unit, who first recovered specimens from nasal washings.

Genus *Steatonyssus* Kolenati

Steatonyssus Kolenati, 1858, Wien. Ent. Monatschr., 2: 6.

Type-species: *Dermanyssus murinus* Lucas, 1840 (= *Dermanyssus periblepharus* Kolenati, 1858).

Steatonyssus occidentalis (Ewing)

Ceratonyssus occidentalis Ewing, 1933, Proc. U.S. Nat. Mus., 82: 10, pl. 3 (fig. 5), pl. 4 (fig. 1).

This is the only species of this large, widely distributed genus taken in Panama. It was recovered from an unidentified bat in El Valle (Coclé), 1 June 1961, collected by W. E. Woodcock. In North America, the usual host is *Eptesicus fuscus*; the range of this bat includes Panama.

Genus *Ichoronyssus* Kolenati

Ichoronyssus Kolenati, 1858, Wien. Ent. Monatschr., 2: 5.

Type-species: *Ichoronyssus scutatus* Kolenati, 1858.

The interpretation of *Ichoronyssus* followed in this paper is that of Strandtmann and Wharton (1958). It will be reinterpreted in a revision by the junior author (in manuscript). The genus (*sensu* Strandtmann and Wharton) is here divided into three groups of related species.

Group I

KEY TO PANAMANIAN SPECIES

FEMALES

1. Third pair of sternal setae on platelets joined to sternal plate by thread-like connections *I. robustipes* (Ewing)
At most, slight constrictions between portions bearing sternal setae III and remainder of plate. 2
2. Sternal plate without constrictions proximal to third pair of setae; anteromedial setae on dorsal shield about 40 μ or more *I. venezolanus* (Vitzthum)
Sternal plate with slight constrictions proximal to third pair of setae; anteromedial setae on dorsal shield about 25 μ or less. *I. haematophagus* (Fonseca)

PROTONYMPHS

1. Coxa I with blunt lateral spur *I. venezolanus* (Vitzthum)
Coxa I without lateral spur 2
2. Unarmed venter with five pairs of setae lateral or anterior to anal plate.
..... *I. haematophagus* (Fonseca)
Unarmed venter with seven pairs of setae lateral or anterior to anal plate.
..... *I. robustipes* (Ewing)

Ichoronyssus robustipes (Ewing)

Liponyssus robustipes Ewing, 1925, Ent. News, 36: 20.

This species is a common parasite of *Tadarida brasiliensis*, a bat ranging over much of North and South America and the West Indies. In Panama, *I. robustipes* was thrice taken from this host in a cave in Cerro Punta

(Chiriquí), 3 April 1961, by C. E. Yunker. Several mites also were taken from *Myotis nigricans* roosting in the same cave.

Ichoronyssus venezolanus (Vitzthum)

Liponyssus venezolanus Vitzthum, 1932, Zeitschr. Parasitenk., 4: 9, figs. 3-13.

Previously known from the type collection from *Molossus nasutus* in Venezuela, protonymphs of *I. venezolanus* were collected from *M. coibensis* and "molossid bats" in a church attic in Pacora (Panamá), 6 June 1961, by C. M. Keenan and C. E. Yunker.

Ichoronyssus haematophagus (Fonseca)

Liponyssus haematophagus Fonseca, 1935b, Mem. Inst. Butantan, 10: 43, figs. 1-2.

Protonymphs of this species were taken from a molossid bat, probably *Molossus coibensis*, in a church attic in Pacora (Panamá), 6 June 1961, by C. M. Keenan and C. E. Yunker. The type collection is from southern Brazil, from *Molossus rufus*.

Group II

KEY TO PANAMANIAN SPECIES

FEMALES

Sternal setae III arising from posterior angles of sternal shield, and shield with slight, neck-like constrictions proximal to these setae; dorsal shield with 26 or 27 pairs of setae.....*I. kochi* Fonseca
 Sternal setae III arising slightly anterior to posterior angles of shield, not set apart by constrictions; dorsal shield with 24 pairs of setae.....New species no. 1

Ichoronyssus kochi Fonseca

Ichoronyssus kochi Fonseca, 1948, Proc. Zool. Soc. London, 118: 278, figs. 17-20.

The type host is *Artibeus* sp. from Brazil, and our records indicate that *Artibeus* is the usual host genus. In Panama, *I. kochi* was taken from *Artibeus toltecus*, Cerro Punta (Chiriquí), April 1961, and Río Changena (Bocas del Toro), September 1961; from *Artibeus jamaicensis*, Juan Mina (Canal Zone), June 1961, and Río Changena (Bocas del Toro), September 1961, by C. E. Yunker.

Ichoronyssus (group II), new species no. 1

This species was found in Panama on *Vampyrops vittatus*. Collections were made from several bats at Río Changena (Bocas del Toro), September 1961, by V. J. Tipton and C. E. Yunker and from a single bat at Cerro Punta (Chiriquí), February 1960, by V. J. Tipton.

Group III

KEY TO PANAMANIAN SPECIES

FEMALES

Peritreme ending over coxa I; dorsal shield with longest anterolateral setae about two or three times as long as shortest anteromedial setae.....
*I. crosbyi* (Ewing and Stover)
 Peritreme ending over coxa II; dorsal shield with longest anterolateral setae about nine or ten times as long as shortest anteromedial setae.....New species no. 1

Ichoronyssus crosbyi (Ewing and Stover)

Liponyssus crosbyi Ewing and Stover, 1915, Ent. News, 26: 112, pl. 4, fig. 3.

In Panama, *I. crosbyi* was recovered from *Myotis chiloensis* and from a mixed lot of *M. chiloensis* and *Myotis nigricans* roosting in a cave in Cerro Punta (Chiriquí), 5 May 1961, by C. E. Yunker. At least one bat was infested with this species and with *Ichoronyssus* (group III), n. sp. no. 1. The latter parasite was far more numerous at this site. In the United States, *I. crosbyi* is known from several other *Myotis* species.

Ichoronyssus (group III), new species no. 1

Large numbers of this species were found on many individual *Myotis nigricans* in a cave in Cerro Punta (Chiriquí), 5 May 1961, by C. E. Yunker. In the same cave, it was taken on a few specimens of *Myotis chiloensis*. A single collection was taken on *M. nigricans* in Cerro Punta (Chiriquí), in March 1962, by V. J. Tipton.

Genus Radfordiella Fonseca

Radfordiella Fonseca, 1948, Proc. Zool. Soc. London, 118: 270.

Type-species: *Radfordiella oudemansi* Fonseca, 1948.

KEY TO PANAMANIAN SPECIES

FEMALES

1. Spur on anterior margin of coxa II bifid; sternal shield short (length at mid-line about 25 μ), with strongly arched posterior margin. *R. oudemansi* Fonseca
- Coxa II with two simple spurs on anterior margin; sternal shield length at mid-line over 50 μ 2
2. Dorsal shield length over 410 μ and usually more than 430 μ ; sternal shield with moderately arched posterior margin reaching slightly beyond level of trichopores of sternal setae III. New species no. 1
- Dorsal shield length under 410 μ ; sternal shield with weakly arched posterior margin rarely reaching beyond level of pores of sternal setae III. New species no. 2

Radfordiella oudemansi Fonseca

Radfordiella oudemansi Fonseca, 1948, loc. cit., 118: 274, figs. 45-48.

R. oudemansi has not been collected in Panama, but it probably occurs there and hence is included in the key. The type material was taken on *Desmodus rotundus* in Brazil.

Radfordiella, new species no. 1

The common vampire bat, *Desmodus rotundus*, appears to be the normal host. Mites were taken in Panama from a number of individuals of *D. rotundus* at Las Palmitas (Los Santos), January 1962, by C. O. Handley and F. Greenwell. We have seen material from the same host in Guatemala and Trinidad.

Radfordiella, new species no. 2

This species was collected in Panama as follows: from *Carollia perspicillata*, Sardanillo, Summit (Canal Zone), 12 August 1961; in a mixed collection of *C. perspicillata* and *Lonchorhina aurita*, same locality and date;

from *C. perspicillata*, Juan Mina (Canal Zone), 30 June 1961; from *Carollia castanea*, Cerro Pirre (Darién), 3 February 1961, by C. E. Yunker. Only the first of these collections contained more than one specimen.

New Genus no. 1

Three undescribed species belonging to to this genus were found in Panama. All of these were taken from phyllostomid bats, as follows: n. sp. no. 1 from *Glossophaga soricina*, Río Changena (Bocas del Toro), 19 September 1961, by C. E. Yunker; n. sp. no. 2 from *Sturnira ludovici* same data; n. sp. no. 3 from *Carollia perspicillata*, Juan Mina (Canal Zone), 20 June 1961, by C. E. Yunker. We also have specimens of n. sp. no. 1 from a phyllostomid bat collected in Costa Rica by J. S. White.

Species inquirendae

Ten collections, consisting solely of protonymphs or males were seen. Due to the existing lack of knowledge concerning immature and male mesostigmata they are not fully identifiable. Two of these, from rodents, are not referable to any of the species known from Panama. They are: Subfamily *Dermanyssinae*, 2 protonymphs from *Hoplomys gymnurus*, Cerro Azul (Panamá), 17 March 1961; Subfamily *Macronyssinae*, 4 protonymphs of *Ornithonyssus* sp. from *Dasytus novemcinctus*, near Pedro Miguel River, Paraíso, (Canal Zone), 27 February 1962.

The remaining eight collections, all macronyssines from bats, are referable to *Radfordiella*, *Ichoronyssus* (group II), new genus no. 1, and an unknown genus. These probably all represent new species, but material is inadequate for treatment.

Addenda

Since this paper was set in type, Till (1964: 90, 92) has synonymized *Pellonyssus passerii* Clark and Yunker, the type-species of *Pellonyssus* Clark and Yunker, under *Steatonyssus reedi* Zumpt and Patterson (1952: 163, fig. 3).

A summary reclassification (Radovsky, 1966a), including the bat-parasitizing Dermanyssidae referred to here, has been in press at the same time as the present paper. The subfamily *Macronyssinae* is treated as a separate family, *Macronyssidae*, which would include nearly all of the Panamanian Dermanyssidae given in this paper (exception: *Dermanyssinae incertae sedis* off *Hoplomys gymnurus*). *Ichoronyssus* (group I) is interpreted as *Chiroptonyssus* Augustson. *Ichoronyssus* (group II) is placed in a new genus. *Ichoronyssus* (group III) is included in *Macronyssus* Kolenati. New genus No. 1 is described, with its new species No. 1 described and designated as type-species of the genus. Descriptions of the six other new species off bats, referred to here by code numbers, are included in a fuller revisionary work (Radovsky, 1966b) to be published soon.

Abstract

Forty-one species of Dermanyssidae were collected from Panamanian vertebrates, mostly mammals. Of these, at least 11 are new species; the remainder are new records for Panama. Described here are: *Ornithonyssus coendou* n. sp. from *Coendou rothschildi*; *Draconyssus belgicae* n. gen., n. sp. from *Ameiva bifrontata*; *Pellonyssus marui* n. sp. from *Cassidix mexicanus*; *Pellonyssus gorgasi* n. sp. from *Phaethornis guy*. The remaining seven new species, from bats, are not described here. *Acanthonyssus* n. gen. is erected for *Neoichoronyssus dentipes* Strandtmann and Eads. Keys to the genera and species and a host list are provided.

HOST-PARASITE LIST

Class REPTILIA

Order SQUAMATA

Family Teiidae

Ameiva sp.*Draconyssus belgicae* n. sp.*Ameiva bifrontata**Draconyssus belgicae* n. sp.

Class AVES

Order GALLIFORMES

Family Phasianidae

Ornithonyssus sylviarum (Canestrini
and Fanzago)

"common hen"

Ornithonyssus bursa (Berlese)

Order COLUMBIFORMES

Family Columbidae

*Columbigallina talpacoti**Pellonyssus marui* n. sp.

Order APODIFORMES

Family Trochilidae

*Phaethornis guy**Pellonyssus gorgasi* n. sp.

Order PICIFORMES

Family Ramphastidae

Aulacorhynchus prasinus

Order PASSERIFORMES

Family Hirundinidae

*Progne chalybea**Pellonyssus marui* n. sp.

Family Turdidae

*Turdus grayi**Pellonyssus marui* n. sp.

Family Vireonidae

*Vireo flavoviridis**Pellonyssus marui* n. sp.

Family Icteridae

*Cassidix mexicanus**Pellonyssus marui* n. sp.

Class MAMMALIA

Order MARSUPIALIA

Family Didelphidae

*Marmosa robinsoni**Ornithonyssus wernecki* (Fonseca)*Philander opossum**Ornithonyssus wernecki* (Fonseca)*Metachirus nudicaudatus**Ornithonyssus wernecki* (Fonseca)*Didelphis marsupialis**Ornithonyssus wernecki* (Fonseca)

Order CHIROPTERA

Family Phyllostomidae

Glossophaga soricina

New genus n. sp. no. 1

*Carollia castanea**Radfordiella* n. sp. no. 2*Carollia perspicillata**Radfordiella* n. sp. no. 2

New genus n. sp. no. 3

Sturnira ludovici

New genus n. sp. no. 2

*Vampyrops vittatus**Ichoronyssus* (group II) n. sp.*Artibeus jamaicensis**Ichoronyssus kochi* Fonseca*Artibeus toltecus**Ichoronyssus kochi* Fonseca

mixed collection of

Carollia perspicillata and*Lonchorhina aurita**Radfordiella* n. sp. no. 2

phyllostomid bat

New genus n. sp. no. 1

Family Desmodidae

Desmodus rotundus*Radfordiella* n. sp. no. 1

Family Vespertilionidae

Myotis chiloensis*Ichoronyssus crosbyi* (Ewing and Stover)

" (group III) n. sp. no. 1

Myotis nigricans*Ichoronyssus robustipes* (Ewing)

" (group III) n. sp. no. 1

Mixed lots of *Myotis nigricans* and**Myotis chiloensis***Ichoronyssus crosbyi* (Ewing and Stover)

Family Molossidae

Tadarida brasiliensis*Ichoronyssus robustipes* (Ewing)**Molossus coibensis***Ichoronyssus venezolanus* (Vitzthum)

molossid bat

Ichoronyssus haematophagus (Fonseca)

Family unknown

bat

Steatonyssus occidentalis (Ewing)*Ichoronyssus venezolanus* (Vitzthum)

Order RODENTIA

Family Sciuridae

Sciurus granatensis*Hirstionyssus keenani* n. sp.**Sciurus variegatoides***Hirstionyssus keenani* n. sp.

Family Heteromyidae

Liomys adpersus*Hirstionyssus microchelae* n. sp.*Ornithonyssus bacoti* (Hirst)**Heteromys desmarestianus***Hirstionyssus heteromydis* n. sp." *panamensis* n. sp." *minutus* n. sp." *microchelae* n. sp." *lunatus* n. sp.

Family Cricetidae

Peromyscus nudipes*Hirstionyssus galindoi* n. sp.**Zygodontomys microtinus***Ornithonyssus bacoti* (Hirst)**Scotinomys xerampelinus***Hirstionyssus galindoi* n. sp.**Sigmodon hispidus***Acanthonyssus dentipes* (Strandtmann and Eads)*Ornithonyssus bacoti* (Hirst)

Family Muridae

Rattus rattus*Ornithonyssus bacoti* (Hirst)

Family Erethizontidae

Coendou rothschildi*Ornithonyssus coendou* n. sp.

Family Echimyidae

Proechimys semispinosus*Acanthonyssus dentipes* (Strandtmann and Eads)*Ornithonyssus bacoti* (Hirst)**Hoplomys gymnurus***Ornithonyssus* sp.

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